

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

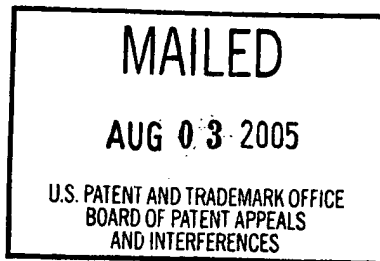
UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte HAMID NOORBAKHS, SIAMAK SALIMIAN, PAUL LUSCHER,  
JAMES D. CARDUCCI, EVANS LEE, KAUSHIK VAIDYA,  
HONGQING SHAN and MICHAEL D. WELCH



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Appeal No. 2005-1052  
Application No. 09/519,719

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ON BRIEF

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Before KIMLIN, OWENS and WALTZ, Administrative Patent Judges.  
KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 11-24, 26-28, 37-38, 40, 42 and 47-58.

Claim 11 is illustrative:

11. A semiconductor processing chamber comprising:

a chamber body having a wall, a bottom and a lid assembly defining a chamber volume,

a substrate support disposed within the chamber volume, and,

Appeal No. 2005-1052  
Application No. 09/519,719

a chamber liner disposed in the chamber volume and having a base substantially covering the bottom of the chamber body, the base having a substantially annular passage formed therein and fluidly isolated from the chamber volume, the base having an inlet and outlet adapted to circulate a fluid through the passage.

The examiner relies upon the following references as evidence of obviousness:

Banholzer et al. (Banholzer)	5,565,058	Oct. 15, 1996
Takeuchi et al. (Takeuchi)	5,824,158	Oct. 20, 1998
Masuda et al. (Masuda)	6,171,438 (effectively filed Mar. 08, 1996)	Jan. 09, 2001
Reimold et al. (Reimold) <sup>1</sup>	De 31 10489	Oct. 14, 1982
Collins et al. (Collins WO '734)	WO 97/08734	Mar. 06, 1997
Shan et al. (Shan)	EP 0 814 495	Dec. 29, 1997
Zhao et al. (Zhao)	EP 0 855 735	Jul. 29, 1998
Collins et al. (Collins)	EP 0 892 422	Jan. 20, 1999
Pu et al. (Pu)	WO 99/48130	Sep. 23, 1999

Appellants' claimed invention is directed to a semiconductor processing chamber comprising a liner having an inlet and outlet which allows the circulation of a fluid that controls the temperature of the liner. According to appellants, "[b]y maintaining a predetermined temperature, the chamber liner

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<sup>1</sup>We rely upon a complete English translation of this document, previously made of record.

manages the deposition of films upon the chamber liner by both minimizing the amount of material deposited upon the liner and maintaining the liner at a uniform temperature with minimal thermal cycling" (page 3 of principal brief, second paragraph).

Appealed claims 53 and 58 stand rejected under 35 U.S.C. § 112, first paragraph, description requirement. The appealed claims also stand rejected under § 103 as follows:

(a) Claims 11-17, 20, 38, 40, 47-48, 51, 53 and 55 over Pu in view of Masuda,

(b) Claim 18 over the stated combination of references further in view of Reimold,

(c) Claims 19, 54, and 56-58 over the stated combination of references further in view of Collins,

(d) Claims 21-24, 49 and 50 over the stated combination of references further in view of Shan,

(e) Claim 42 over the stated combination of references further in view of Collins WO '734,

(f) Claims 11-17, 20-24, 38, 40, 47-51, 53 and 55 over Shan in view of Masuda,

(g) Claim 18 over the stated combination of references in (f) above, further in view of Reimold,

(h) Claims 19, 54 and 56-58 over the combination stated in  
(f) above further in view of Collins,

(i) Claims 26 and 28 over Shan in view of Zhao,

(j) Claim 27 over Shan in view of Zhao and Takeuchi,

(k) Claim 37 over Shan in view of Zhao and Banholzer,

(l) Claim 42 over Shan in view of Masuda and Collins WO  
'734, and

(m) Claim 52 over Shan in view of Masuda and Zhao.

In accordance with the grouping of claims set forth at page 5 of the principal brief, claims 12-17 and 20 stand or fall together with claim 11. Also, claims 22-24 stand or fall together with claim 21, claims 26 and 28 stand or fall together, claims 38 and 40 stand or fall together, claims 48 and 55 stand or fall together with claim 47, and claims 49 and 50 stand or fall together.

We have thoroughly reviewed each of appellants' arguments for patentability. However, we are in complete agreement with the examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will

sustain the examiner's rejections for essentially those reasons set forth in the answer, and we add the following primarily for emphasis.

We consider first the examiner's rejection of claims 53 and 58 under 112, first paragraph, description requirement. We agree with the examiner that the original filed specification fails to provide descriptive support for the claim language "a passage disposed between the liner and a chamber wall." Appellants cite page 4, lines 18-28 and page 7, lines 24-36 of the present specification as well as Figure 3 for their position that the specification describes "a liner for lining a processing chamber wall, the liner having a fluid passage formed in a portion thereof that is adapted to flow a heat transfer fluid" (page 9 of principal brief, first paragraph, emphasis added). However, as acknowledged by appellants in the above quote, the specification describes a fluid passage in the liner not between the liner and the chamber wall. While appellants submit that "those skilled in the art will recognize that the passages position between the chamber wall and the deposition surface . . . of the liner" (id.), the claim language does not define the deposition surface of the liner.

As for the § 103 rejections, we fully concur with the examiner that the collective teachings of Pu, incorporating Shan, and Masuda evidence that it would have been obvious for one of ordinary skill in the art to incorporate temperature-controlling fluid passages into the liner of Pu in order to alleviate the well-know problem of temperature variances on the interior of the liner causing flaking off and deposition of contaminantes. We are not persuaded by appellants' principal argument that the outer shield of Pu primarily functions to control the DC bias of the substrate support, and that "the ability of the outer dielectric shield to control the substrate support's DC bias is directly related to the thickness of the outer shield" (page 10 of principal brief, first paragraph). We agree with the examiner that Shan simply teaches that the RF bias can be adjusted by adjusting the thickness of the shield, which is one of only four ways taught by Shan for adjusting the DC bias. The other ways of adjusting the DC bias disclosed in the abstract of Shan are (1) controlling the surface area of the chamber wall or other grounded components, (2) controlling the gap between the shield and the chamber wall, and (3) controlling the dielectric constant of the dielectric material.

Also, while appellants speculate that providing fluid passages in the shield of Pu "may negatively interfere with the dielectric properties of the shield" (page 10 of principal brief, second paragraph), Pu expressly teaches that the temperature of the lid, as well as other chamber surfaces exposed to plasma, strongly affects the performance of the plasma process (see page 11, third paragraph). Since Pu explicitly teaches regulating the temperature of the lid by employing fluid channels therein, we are confident that Pu would have suggested also utilizing temperature-controlling channels in other chamber surfaces, including the shield. Furthermore, Shan expressly teaches that "keeping the anode and cathode shields cool is important to achieving a low level of particulate contaminate in the chamber" (page 9, lines 28-29). While Shan discloses a preferred embodiment of surrounding the chamber sidewall with cooling channels, we find that one of ordinary skill in the art would have found it obvious to employ cooling channels in the shield of Pu as in the lid of Pu. Indeed, the Masuda disclosure of incorporating a temperature-controlling passage and a removable liner of a plasma chamber underscores the obviousness of providing

such a passage in the shield of Pu. We do not understand appellants' argument that Masuda does not teach both an inlet and an outlet as recited in claim 11. Manifestly, a fluid passage must necessarily comprise an inlet and an outlet.

We also do not subscribe to appellants' argument that Pu does not disclose the claim 38 recitation that the liner comprises a bottom that is coupled between the outer and inner walls of the liner. Rather, we agree with the examiner that Figure 1 of Pu depicts liner 27 having a bottom that is coupled to outer liner 26.

Concerning the other rejections of the examiner which include the combination of other additional references, we agree with the examiner that appellants' arguments are, for the most part, directed to the unnecessary physical incorporation of one reference into another. We concur with the examiner that the collective teachings of the applied references, taken as a whole, would have rendered the various claimed features prima facie obvious to one of ordinary skill in the art. We note that appellants have not proffered any objective evidence of nonobviousness, such as unexpected results, directed to any



Appeal No. 2005-1052  
Application No. 09/519,719


particular claim feature, that would serve to rebut the inference of obviousness established by the prior art.

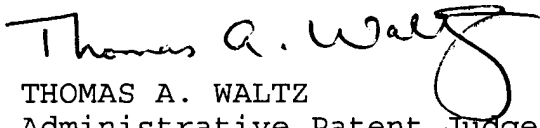
In conclusion, based on the foregoing, the examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

  
EDWARD C. KIMLIN )  
Administrative Patent Judge )

  
TERRY J. OWENS )  
Administrative Patent Judge )

  
THOMAS A. WALTZ )  
Administrative Patent Judge )

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Appeal No. 2005-1052  
Application No. 09/519,719

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